UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/811,071	03/26/2004	Simon Fenney	3700.P0373US	8073

23474 7590 08/10/2009
FLYNN THIEL BOUTELL & TANIS, P.C.
2026 RAMBLING ROAD
KALAMAZOO, MI 49008-1631

EXAMINER	
HAJNIK, DANIEL F	

ART UNIT	PAPER NUMBER
2628	

MAIL DATE	DELIVERY MODE
08/10/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/811,071	FENNEY ET AL.
	Examiner	Art Unit
	DANIEL F. HAJNIK	2628

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 May 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-12 and 14-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,5-12 and 14-28* is/are rejected.

7)☒ Claim(s) *2, 3, 22, and 23* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Foreign Priority

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been received in the most recent response.

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 10-12, 14-18, 20, 24-26, and 28 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 10-12, 14-18, 20, 24-26, and 28 are directed to non-statutory subject matter.

That is, the claims are directed to an apparatus, where the body of the claim contains components which are all software based. This interpretation is based upon evidence in the specification on the top of page 10 where pseudo code for implementing the invention is given. The end of the 1st paragraph on page 10 states "This pseudo code <u>can be implemented by those skilled in the art in either hardware or software</u>". Thus, if one takes a software approach under this interpretation, the claim is seeking an embodiment on software code.

Computer programs claimed as computer listings per se, i.e., the descriptions or expressions of the programs, are not physical "things." They are neither computer components nor statutory processes, as they are not "acts" being performed. Such claimed computer

programs do not define any structural and functional interrelationships between the computer program and other claimed elements of a computer which permit the computer program's functionality to be realized. See Lowry, 32 F.3d at 1583-84, 32 USPQ2d at 1035."

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 5, 10, 14, 19-21, 24, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Redshaw et al. (GB Patent 2,343,603) in view of McNamara (US Pub 2003/0122829) in further view of Steiner (US Patent 5,668,940).

As per claim 1, Redshaw teaches the claimed:

1. A tiling method for culling small objects in a system for shading 3-dimensional computer graphics images, comprising the steps of *(pg. 2, lines 6-11, "if only data pertaining* ***to portions of surfaces*** *which* ***are*** *in fact* ***visible*** *is processed. Thus, in accordance with a preferred embodiment of the invention we provide a method for* ***defining the edges of visible surfaces*** *with planes which are perpendicular to the viewing direction")*:

subdividing a display on which an image is to be viewed into a plurality of rectangular areas *(in figure 6 where a grid of areas is shown)*;

deriving a list of objects in the image which may be visible in that rectangular area *(in figure 5, piece 32, "Object Lists" and pg. 2, lines 21-23, "A* ***display list*** *of the surfaces* ***which fall within that tile*** *is used to define objects within the bounding box")*;

determining maximum and minimum values for each object in the list in x and y directions *(in figures 6 and 7-10 where each figure shows a set of tiles established based upon the maximum and minimum values for an object; in order to have determined the tiles shaded in the figures, the system would have to know the maximum and minimum values for the object)*;

Redshaw does not explicitly teach the remaining claim limitations.

McNamara teaches the claimed:

determining a minimum set of sampling points for the object from the maximum and the minimum values *(in figure 7 where the minimum number set of sampling points 710 is determined by the tiles or stamps; in this figure, the upper left corner of each stamp is a sampling point; and the interior sampling points within the primitive 700 are determined)*;

surrounding the object with a bounding box *(in figure 18; [0057] "FIG. 18 is a diagram of a* *minimal bounding box for a triangle");*

McNamara suggests the claimed:

determining if the bounding box covers any of the sampling points *(in figure 17, in step 1701 where a minimal bounding box is determined; [0127] "FIG. 17A, step 1701 determines the minimal rectangular bounding box (bbox) that encloses the object"; [0186], "At each stamp position, these three adjacent positions are examined to determine if they are valid (that is, should possibly be moved to) ... Sliver positions are unproductive, and generate no fragments" where these positions are samples).*

Also, McNamara suggests the claimed:

culling the object if the bounding box misses all of the sampling points *([0212], "If the sparse context over, or the saved context overSave, is valid, then there is no point in moving to any sliver back and forward positions, whether sparse or saved contexts, even if the over context is not known to be productive. The back and forward slivers never lead to any productive stamp positions"; also see step 1708; also note in this case, the reference defines as a sliver as [0196], "the object slips between two adjacent sample points"; thus, a sliver is an object that has a bounding box that misses all the sampling points).*

It would have been obvious to one of ordinary skill in the art at the time of invention to apply the bounding box and eliminate of slivers with Redshaw in order to reduce the amount of overall

processing of graphics data required to render a given scene. Redshaw is combined with McNamara by applying the bounding box culling test on objects being sampled before examining possible culling of the sample positions individually.

Steiner teaches the claimed:

testing each sampling point against each edge of the object if the bounding box does not miss all the sampling points *(col 13, line 58 – col 14, line 2, "It is also possible to have a polygon, at some level of detail, which is too small to totally cover one pixel. Polygons which are smaller than one pixel, or which have a dimension less than the corner sample point distance D intervals, will scintillate, because, at some positions, the polygon will lie on a sampled corner and be visible, while at other positions the polygon will be between sample corners and not be visible. Small polygons can be detected and filtered (removed or blurred) to reduce scintillation. To do this, each of the four corners C.sub.tl, C.sub.tr, C.sub.bl and C.sub.br of the present pixel 36 are considered independently" where these corners act as sampling points);*

culling the object in the system for shading 3-dimensional computer graphics if the object does not cover any of the sampling points *(col 13, line 58 – col 14, line 2, "It is also possible to have a polygon, at some level of detail, which is too small to totally cover one pixel. Polygons which are smaller than one pixel, or which have a dimension less than the corner sample point distance D intervals, will scintillate, because, at some positions, the polygon will lie on a sampled corner and be visible, while at other positions the polygon will be between sample corners and not be visible. Small polygons can be detected and filtered (removed or blurred) to reduce scintillation.*

To do this, each of the four corners C.sub.tl, C.sub.tr, C.sub.bl and C.sub.br of the present pixel 36 are considered independently" where these corners act as sampling points).

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Redshaw, McNamara, and Steiner in order to reduce scintillation in the rendered scene. Steiner is combined with Redshaw and Steiner by applying the sample culling test of Steiner after the bounding box culling process or McNamara. Steiner is compatible with McNamara and Redshaw because Steiner uses a simple polygon/object setup with sampling positions as screen coordinates.

As per claim 5, Redshaw teaches the claimed:

5. The method according to claim 1 further including the step of, for each of the objects, selecting only those rectangular areas which fall at least partially within the bounding box of the object when determining whether or not that object is to be added to the list for the rectangular area *(in figures 7a-7d, where only the shaded rectangular areas around the bounding box of the object are considered for adding to the list and lines 28-31, "For each edge of the triangle,* ***each tile in the rectangular bounding box*** *must be processed in this way* ***to decide whether or not it should be excluded*** *from the minimal set").*

As per claim 19, Redshaw does not explicitly teach the claimed limitations.

McNamara teaches the claimed:

19. The method according to claim 1 further including the step of determining whether or not the minimum set of the sampling points are spread by more than 2 x 2 pixels, in the x and y directions, wherein the step of testing sampling points is not performed if the sampling points exceed this limit *(in [0009] where a stamp is 2^m pixels wide and 2^n pixels high, where when $m = 1$ and $n = 1$, the stamp size is 2 x 2 pixels; in McNamara, a sliver is considered only when the object falls between the sampling points every pixel; in the case where the minimum sampling points is greater than 2 x 2, the primitive is not as a whole is not considered a sliver and thus testing of sampling points to cull a sliver is not performed).*

It would have been obvious to one of ordinary skill in the art to use the sampling points of a 2x2 limit with Redshaw in order to speed up the system by focusing individual sample point testing only on objects small enough that may not appear in the scene at all, and thus would not have a large impact on the overall rendered scene.

As per claims 10, 14, and 20, these claims are similar in scope to claims 1, 5, and 19, respectively, and thus are rejected under the same rationale.

As per claims 21 and 27, these claims are similar in scope to claims 1 and 19, respectively, and thus are rejected under the same rationale.

As per claims 24 and 28, these claims are similar in scope to claims 1 and 19, respectively, and thus are rejected under the same rationale.

3. Claims 6, 7, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Redshaw et al. (GB Patent 2,343,603) in view of Pearce et al. (US Patent 5,809,219).

As per claim 6, Redshaw teaches the claimed:

6. A tiling method for shading 3-dimensional computer graphics images in a system for shading 3-dimensional computer graphics images *(in the abstract, 1st sentence, "A method and apparatus for shading 3-dimensional computer generated images")* comprising the steps of:

subdividing a display for each of the images into a plurality of rectangular areas *(in figure 6 where a grid of areas is shown)*;

for each object in the image determining a bounding box of the rectangular areas into which the object may fall *(pg. 8, lines 7-11, "A **bounding box for a particular object** can be aligned to tile boundaries so that a list of tiles within the bounding box can then be obtained. This list of tiles is a subset of all the tiles within the screen and **approximates the tiles which intersect with the object**")*;

inserting the object in an object list for the rectangular area based on a result of the determination *(lines 28-31, "For each edge of the triangle, each tile in the rectangular bounding box must be processed in this way **to decide whether or not it should be excluded** from the minimal set"*

where this excluding implies that tiles not excluded would be inserted into the list where the object does not appear, also see figure 5 which shows the tile and object list association);

Redshaw does not explicitly teach the remaining claim limitations.

Redshaw suggests the claimed:

Wherein the step of testing the edge information includes the step of shifting the edge information by a predetermined amount based on an orientation of each edge *(pg. 13, lines 23-27, "**The comparison of the two values** will indicate whether the point lies on the inside or outside of the edge. **The interpretation** of this result **depends on the orientation of the edge** is given in the table in Figure 9").*

It would have been obvious to specific use shifting by a predetermined amount with this teaching of Redshaw in order to simplify mathematic operations. The modification can be achieved by implementing the shifting to the edge equation shown on page 13, line 18, where for example, vertical shifting can be achieved by changing the value of "c".

Pearce teaches the claimed:

testing an edge information from each object against a consistent sample point in each of the rectangular areas to determine whether or not the object falls into each of the rectangular areas in the bounding box *(col 4, line 62 - col 5, line 2, "Within this projected 2D space, the present invention identifies the segments of time during which a sampling point is inside a moving polygon. More specifically, the present invention **intersects a stationary sampling point with the***

moving edges of a polygon. Each of the edges *of the polygon* ***are examined independently****. In this examination, the intersection point on the edge of the polygon and the time of intersection are determined" where the moving edges can be shifting);*

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Redshaw with Pearce in order to simplify the mathematics by having only a stationary point rather than one that moves. For example, this may be useful for rendering games where a small number of polygons on the screen are moving quickly, and thus, it may be easier to keep the sampling points stationary (where their are many more) than keeping the polygons stationary. This may result in improved performance. Redshaw is modified to incorporate Pearce by incorporating the edge test and sample points of Pearce into the tile-bin rendering system of Redshaw. For example, for applying sampling rendering positions inside the shaded tiles in the triangle in figure 6 of Redshaw. In this modification, the edges of the triangle in figure 6 of Redshaw would be moved to a stationary sample point in a tile for testing.

As per claim 7, Redshaw does not explicitly teach the claimed limitations.

Pearce teaches the claimed:

7. The method according to claim 6, wherein the step of shifting the edge information comprises the step of shifting by either a vertical or horizontal dimension of the rectangular area *(in figure 1 which shows motion vectors associated with an edge that is shifting and col 4, lines 57-59, "one or more polygons (not shown) on object 430 are matched to the x,y coordinates of sample points*

402,404" thus the motion vectors can move the edges in x (horizontal) or y (vertical) coordinate dimensions).

It would have been obvious to one of ordinary skill in the art to use the shifting with Redshaw in order to simply the mathematics of the shifting process by adding or subtracting from the x and y coordinates of edge data.

As per claims 15 and 16, these claims are similar in scope to claims 6 and 7, respectively, and thus are rejected under the same rationale.

4. Claims 8 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Redshaw et al. (GB Patent 2,343,603) in view of Pearce et al. (US Patent 5,809,219) in further view of Vatti et al. (US Patent 5,265,210).

As per claim 8, Redshaw does not explicitly teach the claimed limitations.

Vatti teaches the claimed:

8. The method according to claim 7, wherein the shifting step is performed using a floating point calculation *(col 11, lines 34-36, "The* ***addition*** *of the* ***delta scaled values to the coordinates*** *of the address of the just-plotted pixel is accomplished* ***in floating-point format****" where this delta can be used in the shifting process as well).*

It would have been obvious to one of ordinary skill in the art to combine Redshaw, Pearce, and Vatti in order to properly calculate non-integer values that occur in the edge processing, such as edge slope values. Redshaw is modified by Vatti by applying the floating-point format to the vertices and sample coordinates in Redshaw for storing and performing mathematical operations.

As per claim 17, this claim is similar in scope to claim 8, and thus is rejected under the same rationale.

5. Claims 9 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Redshaw et al. (GB Patent 2,343,603) in view of Pearce et al. (US Patent 5,809,219) in further view of Venkataraman et al. (US Pub 2002/0180729).

As per claim 9, Redshaw does not explicitly teach the claimed limitations.

Venkataraman teaches the claimed:

9. The method according to claim 6, wherein the shifting step is performed with a safety margin whereby the object will be included in the object list for the rectangular area if the edge information falls close to the sampling point *(paragraph [0072], "**Cross Edge Detection**" and [0075], "The circularity can be tested by picking three points on the cross edge and **then checking if the sample points lie on a circle, within a tolerance**" where this technique can be applied to an edge of an object to be used with the object list of Redshaw and where the tolerance can be similar to a safety margin).*

It would have been obvious to one of ordinary skill in the art to combine Redshaw, Pearce, and Venkataraman in order to give better edge and sample intersection results by using a comparison test which allows a bit of tolerance. Redshaw is modified to incorporate the safety margin of Venkataraman by applying the tolerance to the edges of the triangle in figure 6 of Redshaw during testing against sample points.

As per claim 18, this claim is similar in scope to claim 9, and thus is rejected under the same rationale.

Allowable Subject Matter

Claims 2, 3, 22, and 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

1. Applicant's arguments filed 5/4/2009 have been fully considered but they are not persuasive.

Applicant argues:

> Further, the Supreme Court upheld patent claims that included use of a computer, Diamond v. Diehr, 450 U.S. 175 (1981), even though the invention included use of an algorithm (bottom of page 11 in filed response)
>
> The present invention also produces a useful, concrete, and tangible result, and thus is within the subject matter of 35 U.S.C. §101. As such, it is believed that the currently presented claims clearly meet the requirements of 35 U.S.C. §101 (top of page 12 in filed response).

The examiner maintains that the non-statutory rejections in this matter are proper because claims 10-12, 14-18, 20, 24-26, and 28, do no explicitly make mention of a computer being present. The applicant should consider explicitly stating that the claimed apparatus comprises a

computer or comprises a hardware component. For example, one may state: "An apparatus ... comprising: a display; means for subdividing the display ... ".

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

In the claim, use of the word "system" or "apparatus" does not inherently mean that the claim is directed to a machine. Only if at least one of the claimed elements of the system is a physical part of a device can the system as claimed constitute part of a device or a combination of devices to be a machine within the meaning of 101. The claimed components are software or program codes which are essentially a data structure, per se. Data structures are descriptive material per se and are not statutory because they are not capable of causing functional change in the computer. Such claimed data structures do not define any structural and functional interrelationships between the data structure and other claimed aspects of the invention which permit the data structure's functionality to be realized.

Further, in regards to the useful, concrete, and tangible result, if the claimed structure is pure data, then claimed data structures do not define any structural and functional interrelationships between the data structure and other claimed aspects of the invention which permit the data structure's functionality to be realized. Since the data structure's functionality is not realized when the claimed invention is a data structure per se, and the claim will not have a tangible result.

Applicant argues:

> This is completely different from the purpose of Redshaw's invention, which as understood is not concerned with rejecting objects from an object list corresponding to a rectangular area or tile and therefore avoiding having to render these objects as is the case with the instant invention, and instead is concerned with rejecting tiles which do not intersect with the object so as to avoid having to process these tiles at all.
> (bottom of page 14 in filed response)
>
> Thus, Redshaw teaches the display list of the surfaces rather than the visible object list.
> (top of page 15 in filed response).

The examiner maintains that the prior art rejections in this matter are proper because in Redshaw the display list of surfaces is a list of potentially visible objects *(pg. 2, lines 6-7, "if only data pertaining to portions of surfaces* <u>*which are in fact visible*</u> *is processed"; pg. 2, lines 21-23, "A* ***display list*** *of the surfaces* ***which fall within that tile*** *is used to define objects within the bounding box").* For this rejection, Redshaw shows how rejecting objects or surfaces from the display list 32 in figure 5 results in processing of only visible objects. According to pg. 2, lines 5-11, rejecting objects is desirable when these objects are not potentially visible. Also, please note that in this rejection, a combination of references is relied upon for teaching all the claimed features those some of the actual claimed culling steps are taught by secondary prior art references as well. Redshaw however does provide the display list or object list architecture to maintain a list of potentially visible objects or surfaces.

Applicant argues:

> As for the step of determining the bounding box of the rectangular areas, Redshaw discloses in page 8, lines 7-11 that a bounding box for a particular object can be aligned to tile boundaries so that a list of tiles within the bounding box can then be obtained. However, Redshaw does not teach the bounding box of the rectangular areas. Instead, Redshaw teaches the bounding box for the object itself (lower half of page 19 in filed response)

In the Redshaw reference, if the reference knows all the tiles that contain the particular object, then the system knows its bounding box as well since the tiles boundaries are known by the system. Redshaw teaches *(pg. 8, lines 7-11, "A* ***bounding box for a particular object*** *can be aligned to tile boundaries so that a list of tiles within the bounding box can then be obtained. This list of tiles is a subset of all the tiles within the screen and* ***approximates the tiles which intersect with the object****").* Redshaw in figure 6 shows the tiles as shaded that contain a particular object. Redshaw knows this bounding box for the tiles as well because the bounding box defines the area shaded in the figure. Further, the coordinates of the shaded tiles boundaries indicate the bounding box.

Applicant argues:

> With respect to the step of inserting the object in the object list for a rectangular area, the Examiner points to Redshaw at page 13, lines 28-31, which read "[f]or each edge of the triangle, each tile in the rectangular bounding box must be processed in this way to decide whether or not it should be excluded from the minimal set." As discussed above with respect to Claim I, this passage, contrary to the Examiner's interpretation, pertains to the exclusion of a tile from a minimal set of tiles which should undergo processing, and not to any step which pertains to determining whether an object should be inserted in an object list for a rectangular area or tile, as recited in Claim 6
> (bottom of page 19 and top of page 20 in filed response)

In Redshaw, determining a minimal set of tiles which undergo processing is related to determining whether an object should in an object list. In this case, the object list is the objects or surfaces to be considered for rendering. In particular, the object list is the objects or surfaces to be considered for rendering with the tiles. The failure to remove of some objects (based on the result of the determination), is an insertion in that the object remains to be considered. In other words, its an insertion into the final list of possible objects or surfaces in the object list.

Applicant remarks:

> Pearce particularly teaches the consistent sample point in each rectangular area whilst the claim requires shifting of the sample point. Redshaw teaches the use of a fixed sample point in relation to an edge rather than a shifting sample point. Thus, the combination is not proper.
>
> As such, even if, for the sake of argument, the steps of Pearce pointed out by the Examiner were somehow combined with Redshaw, this would not result in a method which determines whether objects should be inserted in an object list for a rectangular area, as recited in Claim 6, since neither reference is directed to this feature. As such, the combination of Redshaw and Pearce is not believed to result in the instant invention as defined in Claim 6, and thus the combination is believed improper (upper middle of page 22 in filed response).

The examiner respectfully believes the rejection statement is in good standing. Pearce teaches of using a sampling point to examine a polygon edge. A triangle (polygon) is shown with edges in figure 6 of Redshaw. One of ordinary skill in the art would recognize that tiled areas on the screen often use sampling points in conjunction with polygons to render images. Often one such requirement of the rendering is determination of edges in a polygon. For example, the edges many be needed to determine the extend of an object during the rendering process. One of

ordinary skill in the art may desire to another reference in the computer graphics field that has a polygon and sample point comparison test. Pearce has a sampling point and edges of a polygon which are examined. For example, Pearce teaches the following: *(col 4, line 62 - col 5, line 2, "Within this projected 2D space, the present invention identifies the segments of time during which a sampling point is inside a moving polygon. More specifically, the present invention* ***intersects a stationary sampling point with the moving edges of a polygon****.* ***Each of the edges*** *of the polygon* ***are examined independently****. In this examination, the intersection point on the edge of the polygon and the time of intersection are determined" where the moving edges can be shifting).*

It would have been obvious to one of ordinary skill in the art to modify Pearce to move or shift an edge in relation to a stationary point, because the main concern here is the geometric comparison test. The motivation to combine Pearce and Redshaw is to determine the edge boundaries through testing. The edges may be moved or shifted in Pearce by adding or subtracting to the (X,Y) screen coordinate location for each along the edge.

Pearce overall is directed towards generating motion blur. However, the motion blur does not take away the fact that a sampling point and edge examination is performed. The claimed invention makes reference to “shifting the edge information by a predetermined amount based on an orientation of each edge". However, the portion of Pearce relied upon is for the testing a moving edge with a stationary point. A moving edge is a shifting edge as well. Orientation of an edge is considered when the edge tilted on an angle which results in an orientation. Thus, any geometry comparison between a stationary point and moving edge that

has an orientation or angle is going to be shifted based on the orientation of that edge because the orientation is part of the edge itself.

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Redshaw with Pearce in order to simplify the mathematics by having only a stationary point rather than one that moves.

In response to applicant's argument that their invention uses the claimed ”shifting” for a safe calculation (not simplified mathematics), the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Redshaw is modified to incorporate Pearce by incorporating the edge test and sample points of Pearce into the tile-bin rendering system of Redshaw. For example, for applying sampling rendering positions inside the shaded tiles in the triangle in figure 6 of Redshaw. In this modification, the edges of the triangle in figure 6 of Redshaw would be moved to a stationary sample point in a tile for testing.

Applicant's remaining arguments have also been considered but are moot in view of the new ground(s) of rejection. For example, Deering is no longer relied upon for teaching some of claimed features because the steps have been amended such as in claim 1 in the “determining a minimum set of sampling points” step. Please refer to the new prior art references cited above in the prior art rejections for more details.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Sowizral et al. (US Pub 2002/0050990): Figure 1 and [0008] in the background where the sampling from the rays may miss some objects depending upon the sampling density.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL F. HAJNIK whose telephone number is (571)272-7642. The examiner can normally be reached on Mon-Fri (8:30A-5:00P).

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Ulka Chauhan can be reached on (571) 272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Daniel F Hajnik/
Examiner, Art Unit 2628

/Peter-Anthony Pappas/
Primary Examiner, Art Unit 2628